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SWINE PRODUCTION

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U. S. Department of Agriculture



THE HQG is by far the most valuable farm animal in utilizing farm wastes and in converting the concentrates raised on the farm into a marketable product.

Farmers in various parts of the United States long ago recognized the merit of the hogs as a money-maker. Farmers in certain other parts of the country who heretofore have confined their efforts to grain production are now looking to the hog for assistance in making ends meet or in producing a profit.

Without the hog, profits in the big cattle-fattening industry of the Central West would be jeopardized.

This bulletin is a revision of and supersedes Farmers' Bulletin No. 874, Swine Management.

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SWINE PRODUCTION

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HOG-GROWING SECTIONS OF THE UNITED STATES

ALL REGIONS of the United States may be considered suitable for raising hogs, inasmuch as feeds used to grow and fatten hogs can be produced to a greater or less extent in practically every part of the country.

That section of the country commonly called the Corn Belt is superior to other sections because of the fact that corn, the principal feed used in fattening hogs, is produced in such abundance. In addition to corn, alfalfa, which is undoubtedly the best pasture plant for hogs and the best relished hay crop, can be produced in most parts of the Corn Belt. Many other pasture plants on which hogs do well also can be grown successfully in this section.

It is a common mistake to think that hogs can not be raised successfully in some parts of the country. Corn is not the only feed on which hogs will fatten. In some years there is such a large surplus of corn in the Corn Belt that it is a disadvantage to the hog producer. A supplement containing a considerable amount of protein (bone and muscle-building material) should be fed in addition to corn. Such protein is usually fed in the form of tankage, fish meal, shorts or middlings, or old-process linseed meal, all of which must be purchased. Oftentimes these feeds are high in price when corn is low, and in consequence the low-priced feed is used exclusively, without the best results. Alfalfa contains a higher percentage of protein than other pasture plants in common use, and this fact makes it more valuable as a pasture and also as a hay for hog feeding.

The Corn Belt is the source of supply for large quantities of pork products, particularly hams, bacon, and shoulders, that are con-

¹ Mr. Russell retired Jan. 1, 1937.

sumed in other parts of the country. In most parts of the South an abundance of pasture crops can be produced, which is a distinct advantage in raising hogs. In some sections hogs may be on pasture 12 months in the year. Cowpeas, soybeans, and peanuts are leguminous crops that can be successfully grown in different sections. Corn grows readily in many sections, and feeders report success with cassava, chufas, and sweetpotatoes.

On many farms, particularly in the New England States and on specially equipped feeding lots near large cities, the feeding of garbage is carried on somewhat extensively. Garbage-fed hogs do not make so rapid gains as corn-fed hogs, but they produce pork of equally good quality. Farmers' Bulletin 1133, Feeding Garbage to Hogs, discusses this subject in detail.

Soybeans are a rich protein feed, and should be fed only when supplemented by corn or some other carbohydrate. When soybeans are fed alone satisfactory gains will not be made, and if fed alone for any considerable time the hog carcasses will not be firm. Experiments conducted by State and Federal investigators, using more than 800 hogs in hogging down corn and soybeans, with and without a mineral supplement, failed to produce uniformly hard or soft carcasses. About half the carcasses graded soft and about half, hard. It is largely a question of the preference of the individual hog for either of these feeds. Some hogs seem to like soybeans, while others do not, and some varieties of beans seem to be much more palatable than others.

A number of experiments were made using a definite proportion of corn and beans. In some cases a soft carcass resulted when 12 parts of corn were fed to 1 of soybeans, while in others a firm carcass was produced from 3 parts of corn to 1 of soybeans. The carcasses from the hogs fed the 12 to 1 ration were generally of satisfactory firmness, while those from the 3 to 1 were generally soft. Because of the variability of these results no assurance can be given as to what the carcasses of hogs, fed in the manner indicated, will be.

Extensive experiments conducted by the United States Department of Agriculture cooperating with the State agricultural experiment stations of most of the Southern States showed that when hogs starting at approximately 100 pounds weight are fed peanuts alone for 60 days a soft carcass is produced and that it is impossible to produce a hard carcass by feeding corn and tankage or corn and cottonseed meal to soft hogs for a subsequent period of 60 days.

Later results have shown that 100-pound pigs fed on peanuts during a period of 60 days are made firmer by subsequent feeding of hardening feed. However, it is yet impossible from these data to recommend a practical method of producing a strictly hard carcass from such hogs. The products of soft hogs are such that the packers discriminate against them. In some sections the deductions in live-weight price from standard hard hogs are 1 cent a pound for hogs that grade soft and 2 cents for those grading oily; in other sections 2 cents is deducted for soft or oily hogs, while at other markets a 3-cent deduction is made. However, these deductions should not discourage the production of hogs in peanut-growing sections, as in many cases the reduced price may be accepted and still the producer will be able to show a profit.

In many of the great valleys of the Western States, especially in the irrigated sections, barley and wheat, both of which are used in fattening hogs, grow in abundance. These lands produce good alfalfa, which makes hog growing a possible and profitable business. At the present time a considerable percentage of the hogs slaughtered in the packing plants of the Mountain and Pacific Coast States are shipped from the western part of the Corn Belt. Most of these hogs could be profitably grown in the Western States or near the slaughtering points.

Milk and milk products are always valuable as supplementary feeds for hogs but should not be used as a whole ration. These products are not necessary for the successful production of hogs, though in dairy districts they form an important part of the hog's ration and are recommended where they may be obtained at a suitable price.

Skim milk and milk by-products, however, may contain disease germs, especially those of tuberculosis, and should be sterilized by cooking before feeding to hogs unless they are known to come from cows that have been tested and found free from this disease.

LOCATION OF FARM FOR HOG RAISING

The feeds necessary to grow and fatten hogs should be given first consideration when the question of location of a farm for hog raising is being considered. Feeds can be produced more abundantly in some localities than in others. Other factors, such as markets and quality of soil, also should be studied. Sanitary conditions are more favorable where the land is rolling. If the farm is level and flat, it is advisable to throw up ridges with a scraper or road grader and to feed and house the hogs on these ridges. Good roads and accessibility to market are always to be considered.

NUMBER OF HOGS FOR A FARM

When beginning the hog business it is best to start with but a few sows, and as the herd increases in numbers a careful study of the farm should be made to determine what crops it will produce most successfully and how and to what extent hogs fit into the general plan for that particular farm. The study of these problems will soon indicate the number of brood sows which can be kept to farrow each year to make the most profit. When this conclusion is reached, this number of sows should be adhered to as nearly as possible year after year. Market prices for hogs or for feeds used in fattening hogs taken alone should not be allowed to determine the number of sows to be bred at any breeding season. The fact should always be kept in mind that prices for both hogs and feed may change very greatly before the time comes to sell the next crop of pigs. The amount of available by-products, such as skim milk, shattered grain from grain fields, unmarketable products from the truck farm, undigested grain in the droppings of fattening steers, and other minor wastes of feed should be taken into consideration when calculating the number of hogs to be raised yearly.

SELECTION OF BREEDING STOCK

It is always advisable to use purebred animals in founding a herd. Too much valuable time and money are lost by starting with low-grade sows and expecting improvement by use of purebred boars. Considering the rapidity with which hogs multiply, the initial cost of one or more good, purebred sows of either the bacon or lard type as foundation animals is such that the outlay is a good business investment.

THE SOWS

In making the purchase of the foundation sows attention should be given to the type of animals to be used. Select sows of uniform type, of the same breed, similar in color, marking, and conformation. Sows of good type and conformation may be found in all the standard breeds. It is generally advisable to buy sows already bred when

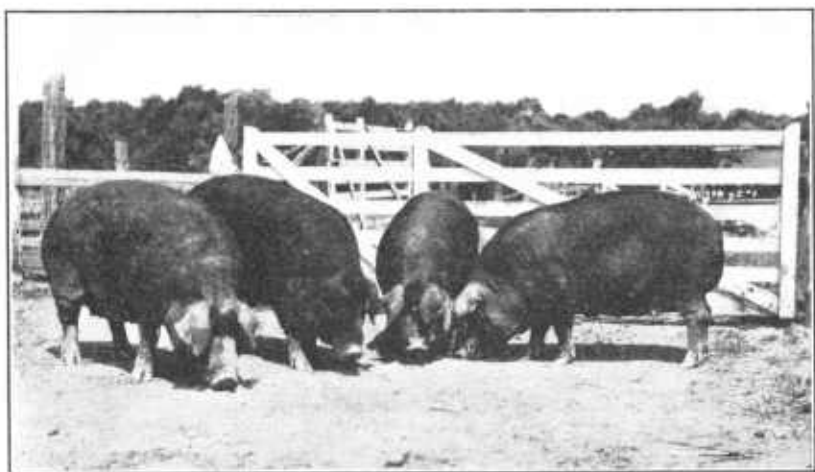


FIGURE 1.—Quality as shown in a brood sow (left) and three of her produce

buying foundation animals. Tried sows or gilts may be used. Too often not enough attention is given the sows in the herd. Hog men depend too much on the boar to produce the quality and type of hogs desired. An old, experienced hog man once said to the writer, "Show me the sows in the herd and I'll tell you the kind of pigs that will be produced." There is a lot of truth in this statement. (Fig. 1.)

First of all, the sow should show femininity. She should have a rather thin neck, good, clear eyes, ears of fair size, yet controlled so they will not cover the eyes and obstruct the sight, and a clean "sow" face, with good width between the eyes. She should be up-standing, with legs of sufficient length so that the udder will not touch the ground when she matures. The back should be well arched, not too broad. She should have good, smooth, deep sides, and well-rounded hams. The udder should be well developed and have two rows of teats, at least six in each row. Her legs should be strong and well placed under the body, with good feet and short, strong pasterns. Particular attention should be given to the heart

girth. It should be full and smooth, with no depression showing behind the shoulders.

The disposition of the sow should receive careful attention. A good brood sow will permit the attendant to be in the pen with her at any time. A cross, nervous, or irritable sow is undesirable and should be eliminated from the herd as soon as practicable. This trait may be hereditary, so it is advisable not to retain the pigs from such a sow in the breeding herd.

A careful selection of sows raising good-sized litters of pigs that grow out well will soon establish a breeding herd of value. It is questionable management to follow the practice of using gilts, having them produce one litter and then fattening all of them for market. The continuous use of immature breeding animals may reduce the vitality and quality of the herd. It prevents also the building up of a good herd of producing sows which have been selected because of their ability to raise good litters of strong, thrifty pigs.

The function of a brood sow is to produce pigs at a profit. The cost of keeping a sow on the farm is the same regardless of the number of pigs she produces. If a sow raises eight pigs to the weaning age, she is more profitable than if she raises only five; therefore prolificacy is a very important essential in selection. Not only the sow to be placed in the herd, but the dam and granddam as well, should come from good-sized litters. If the sow selected is a tried sow, her performance in production should be satisfactory.

Uniformity in type, color, and conformation is highly desirable. This can usually be secured best by making the purchase from one herd. The produce of each individual sow should be observed, and when pigs from any sow do not conform to the type and growth of the general herd she should be replaced by a gilt from a sow whose pigs show good type and feeding qualities. Careful selection and the elimination of undesirable individuals will enable the grower in a few years to produce animals of uniform type and feeding qualities, which in turn command a better price on the market.

THE BOAR

The selection of a boar is probably one of the most important things that the hog raiser has to do. If possible, everyone having breeding sows should have a boar, although when one has only three or four sows and arrangements can be made with some near-by neighbor who has a boar, it may be advisable not to make the necessary outlay to purchase one. It is very unsatisfactory, however, to take the sows off the place for breeding. Better success will be obtained in getting them "settled" if they can be mated on the place.

Careful study should be made of the sows in the herd in order that faults in conformation may be noted. When the boar is purchased he should be selected with the idea of correcting these faults to as great an extent as possible. It is undoubtedly true that "the boar is half the herd," but success can not be obtained unless quality and type of both the sows and the boar are given careful consideration.

Selection of the boar should be deferred until he is at least six months old. At that age a boar is generally so developed that serious faults may be seen. To tell the outcome of a suckling or weanling

pig is practically impossible. It is always advisable in purchasing a boar to see the sire, the dam, and other animals in the herd which are closely related to the one under consideration.

It is better to purchase a tried boar if one of the right type and conformation can be obtained at a reasonable price. If a tried boar is under consideration, the pigs he has sired should be carefully observed to see whether his particular qualities have been transmitted. A boar with good conformation is not always a good sire.

A boar used as a sire should not be discarded until the growing and feeding qualities of his get are determined by a test in the feed lot. Sires of superior quality are not numerous. When the practice is followed of using a boar one season and then marketing him many a valuable sire may be sent to the block that should have been retained in the herd.

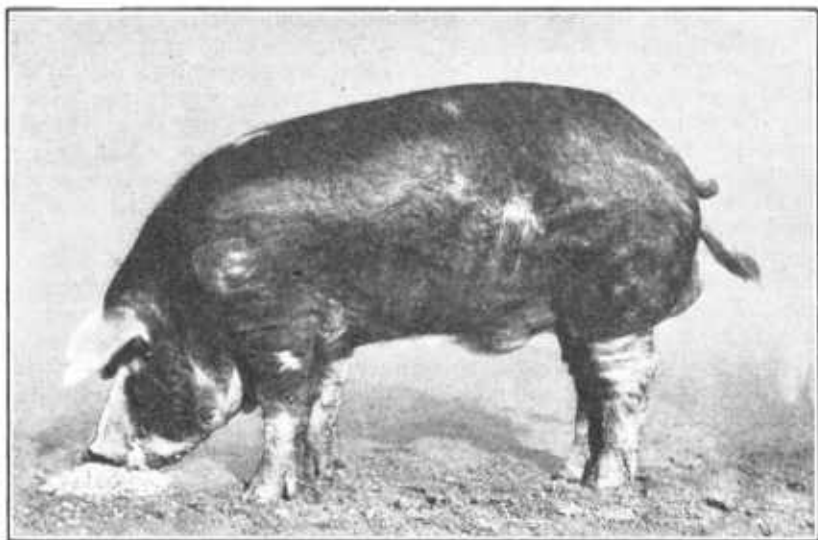


FIGURE 2.—Boar of a desirable type

A boar should not be used before he is 8 months of age, and if he proves a superior sire should be retained in the herd until in the judgment of the owner he should be discarded, which may be at the age of 6 or 8 years or even older. (Fig. 2.)

A herd boar must be handled frequently; consequently his disposition must be given careful attention. A cross, irritable boar, difficult to drive or inclined to fight, should not be selected unless he has some extraordinary qualities that are urgently needed in the herd.

The boar must show masculinity. This is characterized by a strong, wide head, a short, thick, well-crested neck, well-developed shoulders, a strong, well-arched back, well-sprung ribs, and a good covering of flesh. The hair of the boar is generally coarser than that of the sow. His hams should be round and full, his sides even and smooth. Wrinkles or creases in the sides and shoulders are very objectionable. He should by all means have strong feet and legs. The bone should be of good quality and of sufficient size to carry easily any weight that he may attain. Particular attention should

be given to the pasterns, which should be short and straight. When standing at some distance in front of a boar one should easily be able to distinguish him from a sow. His reproductive organs should be clearly visible and well developed. A boar with only one testicle should never be selected.

Rupture is a weakness to be guarded against and the selection of either a boar or sow from a litter in which an animal of either sex is ruptured, is not recommended. A deficiency in the heart girth is probably a constitutional weakness, and animals having a pronounced defect of this kind should not be retained.

MANAGEMENT OF THE BOAR

The careful attention of the herdsman is required during the breeding season. An inclosure, preferably under cover, should be provided, in which a breeding crate is placed, and where all the sows should be taken to be bred. A boar carefully and properly handled soon becomes accustomed to a breeding crate and more successful services will be obtained by its use. He should never be allowed to run with the sows during the breeding season. He should not be confined to a small pen, but should have the run of a good-sized lot or pasture. The boar lot should be convenient to the breeding pen. It is also desirable to have the boar lot so located that breeding sows or other hogs are not placed in adjoining lots or fields. During the breeding season the boar should be undisturbed as much of the time as possible.

One service to each sow is sufficient. A young boar should not be allowed to serve more than one sow each 24 hours. It is best for an aged boar not to serve more than one sow a day, but if necessary a strong, vigorous, aged boar may serve two sows in a day, breeding one early in the morning and the other late in the evening.

The feed given the boar during the breeding season should be abundant and of good quality, in fact all he will clean up twice daily. It is advisable to feed corn in addition to a thick slop of middlings or shorts, to which may be added a small quantity of tankage, fish meal, or old-process linseed meal. When pasture is not available, alfalfa hay of good quality should be supplied in a rack. Salt and mineral mixture should also be provided.

If a boar becomes restless and gets to "ranting," the trouble may sometimes be overcome by placing a bred sow in the lot with him. Occasionally during the breeding season a boar goes off his feed. If this occurs, put a young boar pig in his lot. The boar frequently will eat the feed offered to keep the pig from getting it.

After the breeding season is over the feed of the boar should be reduced so that he will just keep in a good, thrifty condition. Only a small quantity of corn should be fed at this time, his main feed being middlings or shorts, oats, or a little linseed meal, with the run of a good pasture.

AGE FOR BREEDING SOWS

The age at which a gilt should be bred to produce her first litter may depend somewhat on her development. If the breeder is to get

the best results he should select only growthy, well-developed young sows. A well-developed young sow can be bred safely when she is 8 months old, but it is not advisable to breed her before that time. Sows bred at too young an age seldom produce as they should, frequently have trouble at farrowing time, and do not make the best growth after weaning their first litters.

It is advisable not to breed a sow to farrow in the fall after she weans her first litter in the spring at an age of about 12 months. She should have the entire time between weaning her spring litter and being bred in the fall, for growth and development. After she is 2 years old, however, she is fully capable of producing two litters a year.

A brood sow that produces a good-sized litter that is profitable in the feed lot or breeding herd should be retained as long as her usefulness continues. This is often from six to eight years, sometimes longer. The writer had one sow that produced a good litter at the age of 11 years.

A sow will generally farrow in from 112 to 115 days after the day she is bred. In some instances she will farrow in 110 or 111 days and sometimes she may go a few days over 115. By keeping a careful service record, the breeder will be able to determine quite accurately when to expect the pigs and to make his arrangements accordingly. The gestation table on page 9 is based on a period of 112 days. The first line of dates in each column indicates the dates of breeding and directly opposite is the date on which the sow is due to farrow.

MANAGEMENT OF SOWS DURING PREGNANCY

The result of the year's work with hogs depends more largely on the management and feeding of the sows during pregnancy than during any other period. If the sows are not properly conditioned for farrowing, the pigs will not get a good start, and consequently can not make the growth and profit that they should. Suitable feed and ample exercise are the two most important factors of care during pregnancy. Housing, bedding, and watering have their place and must be given careful attention. In addition to the brood sow keeping up her own bodily functions she must develop the litter. If this is accomplished, a variety of the right kinds of feed must be given her. She must be in the best possible condition at farrowing time; and even though given all the feed she will eat, she will not be too fat. The principal common feeds used for brood sows are corn, shorts or middlings, fish meal or tankage, old-process linseed meal, bran, alfalfa hay or meal, oats, and barley. Corn is the most common and most important feed used and when fed judiciously with the right combination of the above-mentioned feeds will produce the best results.

Proper management at this time requires that feeding and exercise be linked together. It is better to produce the exercise through a system of feeding than by driving the sows around the lots or fields.

A plan of feeding and handling sows that has been successfully followed at the United States Animal Husbandry Experiment Farm at Beltsville, Md., is as follows: When the sow is bred she is put into the field or lot in which she will stay until she farrows. This field is

provided with a good, though cheaply constructed house, that is weatherproof and is kept well bedded. The rations for the brood sows include corn, tankage, middlings, alfalfa hay, and mineral. Shelled corn is fed (ear corn may be used if desired) and scattered in the field in sufficient amount to last the sows about seven or eight days. About $1\frac{1}{2}$ pounds of corn is fed daily for each 100 pounds of live weight of the sow. If, for instance, there are 30 sows in the lot averaging 300 pounds in weight, that would mean $4\frac{1}{2}$ pounds of corn a day for each hog or 135 pounds for the 30 sows. If 1,080 pounds were scattered it would be enough for eight days. This corn is put into a wagon box and scattered thinly by not taking over one-quarter of a scoopful at a time, throwing it as far as possible (fig. 3). In this way a sow can seldom pick up two grains at one time and if this work is done thoroughly enough she will get tired before she eats very much



FIGURE 3.—Scattering shelled corn for brood sows

and some corn will still be available on the eighth day. If ear corn is used it is scattered over a wide area so that there is only an ear in a place. No corn is wasted even in snow or mud as has been shown by the fact that no volunteer corn appears in these fields in the spring.

It is not advisable to scatter any of the small grains in this way. If small grains are fed they should be coarsely ground and fed in troughs and in order to get the sows to take exercise the troughs should be placed a moderate distance from the sleeping quarters.

One-half pound of tankage and 1 pound of middlings mixed for each sow are fed in troughs at noon. An alfalfa rack (fig. 4) is in the field where the sows can get good, bright, alfalfa hay when they want it. They also have access to a simple mineral mixture in a box or self-feeder under cover. This plan gives the sow a ration containing about 15 per cent protein, which is believed to be about right. A sow must have a higher percentage of protein during gestation than a fattening hog.

Under this plan, 80 sows and gilts have been successfully carried in a 15-acre field, though a much larger field is preferred. They are

not kept separate on account of age. Water should be supplied from an automatic waterer, attached to the water-supply pipe line, or from a running stream.

This plan has been followed for four years and in only one year of the four was it necessary to take out a sow for better conditioning. Under this plan, sows should make average gains of from three-fourths of a pound to 1 pound a day during this time.

In some sections of the country, particularly in the Northwest, hog raisers have trouble with hairless pigs or goiter. This can best be prevented by feeding the sows potassium iodide during pregnancy. Three grains of potassium iodide, dissolved in water and mixed with the sows' feed once a week during the gestation period, is sufficient to prevent the trouble.

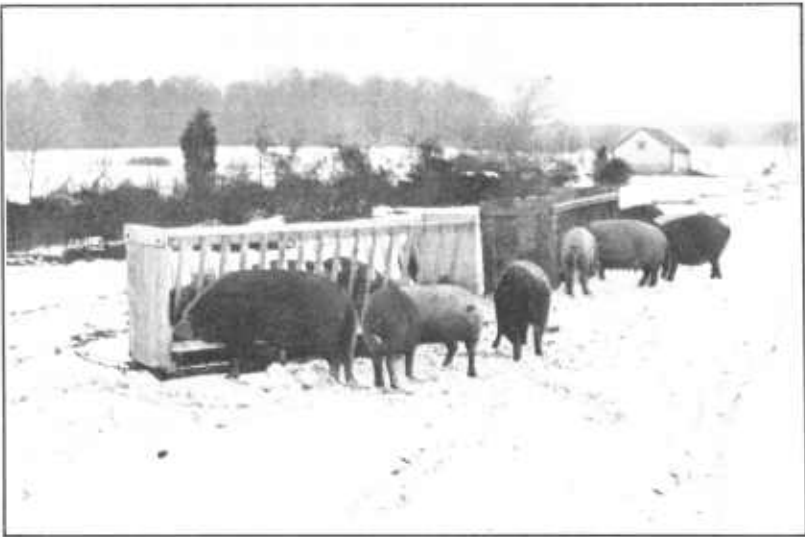


FIGURE 4.—Alfalfa hay in racks for brood sows

CARE OF SOW AND PIGS AT FARROWING

About three days before a sow is due to farrow she should be confined to the pen or house where she will be during the farrowing period. The pen should be thoroughly cleaned. (Fig. 5.) It should be dry, well ventilated, about 7 by 7 feet in size, and provided with a guard rail made by placing 2 by 4 inch pieces around the inside of the pen about 10 inches from the floor and from 4 to 6 inches from the sides (fig. 6). This will often prevent the sow from crushing a pig when she lies down.

Remove all the bedding, sweep the floor and sides, and wash with scalding water and lye. When dry, bed the pen with good, clean, dry bedding. Wheat or rye straw, short or chopped hay, and shredded corn fodder are good. Do not use oat straw, as it retains moisture and becomes foul too easily. The quantity of bedding to use should be determined generally by the condition of the weather and by the sow herself. She should be made comfortable. If too

little bedding is used, the sow will keep getting up and trying to collect it in a bunch in order to keep herself and the pigs warm.

Before putting the sow into the pen all mud and filth, especially on her udder, should be removed by washing with soap and warm water. (Fig. 7.) The sow generally becomes nervous and restless as parturition approaches. She makes a nest for her young. Milk comes down in the teats.

An attendant should always be at hand during farrowing to give any needed assistance. When farrowing occurs during cold weather a box or a basket should be provided, lined with sacks or other cloth, and in the center place some warm bricks or a jug of hot water wrapped in cloth to protect the young pigs. (Fig. 8.) The receptacle should be lightly covered to hold the heat. As the pigs arrive they

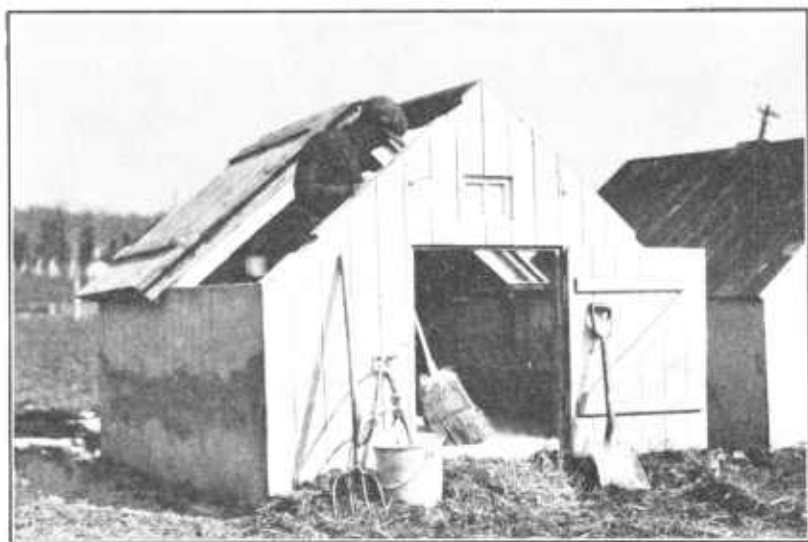


FIGURE 5.—Cleaning and disinfecting the farrowing pen before placing the sow in it to farrow

should be thoroughly dried, the navel cord tied with a common cotton string about an inch from the belly, and the cord cut just below the tie. It is good practice to treat the raw edges of the wound with tincture of iodine. After this treatment the pigs should be placed in the box or basket until all are farrowed, provided the time is not more than two or three hours. If farrowing is prolonged, place the pigs to the sow, let them nurse, and return them again to the box or basket.

If any of the pigs appear to be lifeless when born, immediately remove all mucus from the nose, then give them a few gentle slaps on the side with the hand. This may start breathing if there is any life in the body.

A pig is born with eight small tusklike teeth, four in each jaw. These should be cut off before the pigs are placed with the sow to nurse. Care should be taken in cutting these teeth not to injure the jaw or gums. Use sharp, side-cutting pliers, cutting about halfway between the jaw and the point of the tooth. Do not attempt to break



FIGURE 6.—A well-bedded farrowing pen protected by a guard rail



FIGURE 7.—Washing the sow's sides and udder before farrowing

or pull them. They are very sharp, and if not cut the pigs may bite the sow's teats when nursing, causing her to jump suddenly, possibly injuring or killing some of the pigs. Another reason is that the pigs may bite or scratch one another, allowing infection to start and causing serious trouble. (Fig. 9.)

Each farrowing pen should be supplied with an outside feeding pen or floor, away from the little pigs, where the sow may be fed. This pen should be as wide as the farrowing pen, extending 6 or 8 feet from the building. If the feed is supplied in the farrowing pen, the sow is apt to cripple or kill one or more of the little pigs while eating. On the other hand, if the sow is fed outside, she will deposit her droppings there, preventing the bedding from becoming foul or wet.



FIGURE 8.—Protecting the newborn pigs against chilling in cold weather. Jug contains hot water

It sometimes happens that when the sow farrows she will not have any milk. When such cases occur the newly farrowed pigs should be fed cow's milk, undiluted, in small quantities at about 2-hour intervals. This milk may be fed with a nipple or by pouring a small quantity, not more than half an inch in depth, into the bottom of a thoroughly cleaned shallow tin pan. The pigs will rub their noses in the milk and soon begin to drink. Care must be taken not to overfeed them, especially when they are only a few days old.

SOWS THAT EAT THEIR PIGS

It is not natural for a sow to eat her pigs. The desire to do so may result from several causes. It is probably because she has not been properly fed and cared for during pregnancy. Plenty of exercise and feeds such as are described under "Management of sows

during pregnancy" will usually prevent this trouble at farrowing. Care should always be taken to see that the bowels are in proper condition. If they are not, feed a sufficient quantity (about a pint) of linseed meal or a handful of Glauber salt dissolved in the drinking water or slop.

THE SOW'S FEED

Reduce the richness and quantity of the sow's feed by at least half 24 hours before she farrows. She should have no feed during the first 24 hours after farrowing, but because of her feverish condition she should have plenty of lukewarm water at frequent intervals.

After 24 hours the sow should be given a small feed of a light slop of shorts or middlings, and the same feeds she has had during



FIGURE 9.—Cutting the baby teeth before nursing will help to prevent injuries by young pigs

pregnancy should be continued. The pigs should be closely examined before each feeding of the sow until they are about 10 days old for any appearance of white scours or diarrhea. If this trouble appears, discontinue feeding the slop and give the sow a small quantity of oats, scattered thinly on the floor. Prepare limewater by dissolving a piece of rock lime about the size of a baseball in a gallon of water; after it settles drain off the water and give it to the sow to drink; also bathe the sow's udder and teats with some of the limewater. The pigs which are scouring should be given five drops of diluted formalin (on the tongue), prepared by mixing 1 ounce of standard-strength formalin and 1 pint of water.

The feed of the sow should be gradually increased, adding some corn to the ration about the third or fourth day after farrowing.

When the pigs are from 10 days to 2 weeks old she should be on full feed and have all the good feed she will eat. She should then be removed from the farrowing pen to a lot or field containing good pasture of some sort, if pasture is available; if not, move her to some quarters other than the farrowing pen. If possible, the new quarters should be where no hogs have been during the last year or on ground that has been plowed since hogs were there.

MANAGEMENT OF SOWS AND SUCKLING PIGS

During the suckling period sows and pigs should always be provided with dry, warm, well-bedded sleeping quarters, where they may go in comfort at any time. The bedding must be watched carefully and changed before it becomes foul or wet.

The hog is one of the best and most profitable means of converting the grain and a part of the pasture crops of the farm into

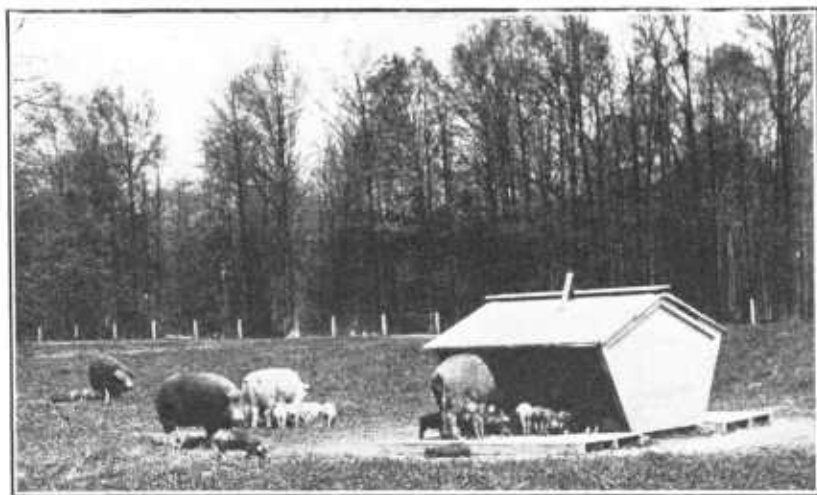


FIGURE 10.—Self-feeders may be profitably used for sows and pigs during the suckling period

edible meat. If the greatest profit is to be returned to the feeder, the pigs must make maximum gains all the time. The profitable pig is one that never stops growing from farrowing to market.

Several years ago at the United States Animal Husbandry Experiment Farm at Beltsville, Md., a series of experiments covering a period of three years, with both fall and spring pigs, was conducted to determine the value of self-feeders for sows and pigs during suckling. Both the sows and the pigs having access to a self-feeder did better during this period than did those in the hand-fed lots and there was also a saving of feed. The plan of feeding in these experiments was as follows:

Practically equal numbers of sows and their pigs were placed in two different lots. In one lot a self-feeder containing corn, tankage, middlings, and a simple mineral mixture, all in separate compartments, was placed. Both the sows and pigs had access to it at

all times. (Fig. 10.) The sows and pigs in the other lot were fed all they would eat readily, twice daily of the same feeds as were contained in the self-feeder. In addition a self-feeder was placed in a creep where the little pigs could go at will, undisturbed by the sows. The same feeds were supplied in the creep as were given to the sows.

Since the time these experiments were conducted, the self-feeding plan has been followed with very satisfactory results.

When the sows and pigs are hand fed during suckling, a creep containing a self-feeder filled with shelled corn should be provided



FIGURE 11.—A creep should be so arranged that the pigs may get their feed undisturbed

for the pigs when they are about 3 weeks old. When constructing the creep leave an opening at one or more places sufficiently wide and high to permit the pigs to walk in and out freely. Build the sides close to the ground so that they can not crawl under. (Fig. 11.) If pigs enter the creep by crawling under there is always an unnecessary waste of energy, and poor development of the backs of such pigs occurs. There should be free access to a mineral mixture (see p. 25); it should be placed in a small self-feeder at the end of the larger one or supplied in a separate compartment of the grain feeder.

When the pigs are about 5 or 6 weeks old, some protein supplement to the corn should be provided. Shorts or middlings of good quality are very desirable for this purpose. This feed should be fed separately from the feeder and not mixed with the corn. Tankage, fish meal, or old-process linseed meal may be substituted for shorts or middlings.

ANEMIA IN SUCKLING PIGS

Anemia, as the name implies, is a thin, watery condition of the blood, and most often occurs in young pigs confined without access to soil. The condition is primarily due to a deficiency of iron and copper in the sow's milk and supplementary feed. Pigs that develop anemia become sluggish and show lack of vigor, a paleness of the mucous membranes, and a rough, dull appearance of the hair. As the disease progresses, the pigs become weak and thin and may develop scours or thumps.

The placing of clean fresh soil or sod on the floor of the pen to which pigs have access has generally proved beneficial. In sections where there is an iron deficiency, the soil treatment is more effective when fortified with 10 grams of ferrous sulphate and 1.5 grams of copper sulphate per 50 pounds of soil. Dissolve the iron and copper salts in a pint of hot water and sprinkle the solution over the soil, mixing it with the soil thoroughly. Swabbing the sow's udder once a day with a saturated ferrous sulphate solution until the pigs are 6 weeks old is an effective method of preventing anemia. In bad cases of the disease individual medication may be necessary. For 3-week-old pigs a teaspoonful of the solution recommended for sprinkling on the soil, given as a drench once a day, furnishes adequate amounts of the minerals for rapidly correcting the deficiency.

CASTRATION

Pigs should be castrated while still sucking their dams—early enough to allow plenty of time for the wounds to heal thoroughly before weaning. For detailed information consult Farmers' Bulletin 1357, *Castration of Hogs*.

WEANING THE PIGS

Hog raisers differ widely in their opinions on the age at which pigs should be weaned. Pigs are weaned at all ages from 5 to 12 weeks, or even older. The mother's milk is the natural and best food for a pig, and should be used to the greatest possible extent. A good brood sow, properly fed and handled, will furnish a good flow of milk until the pigs are from 10 to 12 weeks old. A sow that will not do this should be discarded.

Without some special reason, pigs should not be weaned until they are at least 8 weeks old. Some breeders wean them earlier to get two litters a year. Generally this is not necessary. It is better to raise three litters in two years. A pig stunted by early weaning or any other cause will never be so profitable as it would have been without this setback.

When pigs are self-fed while suckling, it is advisable to build a fence around the self-feeders, three or four days before the sows are to be taken away, leaving openings large enough to permit the pigs access to the feeds whenever they desire. Shutting off the feed from the sows reduces the milk flow and the pigs soon depend entirely upon the feeders.

If the sows are hand fed during suckling, weaning should begin by reducing the richness and quantity of the sow's feed four or five days before weaning. This will tend to reduce the milk flow. Then remove the sow, leaving the pigs in the quarters they occupied while suckling, with access to the self-feeder.

If the sow is handled in this manner it will seldom be necessary to milk her to prevent a caked udder. If the udder becomes too full, return the sow to the pigs to suckle and remove her as soon as they have finished. It is rarely necessary to return the sow to the pigs more than once.

After the pigs are weaned do not change the ration. Leave them on good pasture with access to the self-feeder containing corn, a protein feed, and mineral mixture. If at any time while the pigs are suckling or after they are weaned skim milk or buttermilk is added to the ration, commence feeding the added feed in small quantities, gradually increasing the amount fed daily.

In areas where there is danger from hog cholera the young pigs should be immunized, preferably during suckling. This subject is discussed further under Hog Cholera.

TWO LITTERS A YEAR

The question of raising one or two litters a year is one on which positive advice can not be given. Much depends on where the hog grower is located, his equipment for handling pigs during the winter, how the scheme fits into his farming operations, and other local problems. Fall pigs require a great deal of attention, and most farmers are not in position to care for as many fall pigs as spring pigs. The age at which pigs are weaned has much to do with raising two litters a year. Best general results will be obtained if pigs are allowed to nurse their mothers for at least 8 weeks.

In the northern half of the United States fall pigs should not be farrowed after October 15. If farrowed at a later date, they will not have sufficient time to become well started before cold weather sets in. Throughout the country a large percentage of the spring pigs are farrowed in March and April and fall pigs in September and October. If a sow farrows March 15 and the pigs suckle 10 weeks, they will be weaned May 24. If the sow is in good condition, she will come "in season" three or four days after the pigs are weaned and may be immediately rebred. If she is rebred May 28, she will farrow September 16. These pigs would be weaned November 25, which would allow rebreeding for farrowing March 20. It is not always possible to get a sow settled at the first service and this uncertainty makes it difficult to assure farrowing at the proper time; therefore the raising of two litters a year from all the sows in the herd is impossible.

If the pigs are allowed to suckle 8 weeks, as they should be, it is easily possible for a good sow to raise three litters every two years. This is a good average and would probably meet the requirements of most farmers and show the best net profits in the end.

FALL PIGS

Pigs farrowed in the fall require more attention than those farrowed in the spring. This applies more particularly to the northern part of the country than to the South. During the winter in all parts of the country fall pigs should have easy access to comfortable, dry, well-bedded quarters. In the North, where snows are frequent, pigs running in and out naturally carry in more or less moisture,

causing the bedding to become damp. Pigs should never be required to sleep on damp bedding; consequently the bedding must be watched closely and changed often.

A constant supply of water is always needed. In cold regions the open-trough plan of watering is seldom efficient. An automatic, heated waterer should be provided.

In the southern part of the country winter pasture of some kind can generally be provided. Fall pigs, as well as other hogs, should have access to winter pasture when available. (Fig. 12.)

FEEDS

Corn is the principal grain feed used for hogs but because of its deficiency in protein it must be supplemented with some feed high in this respect. Other feeds available to the American hog producer, that may be substituted to a greater or less extent for corn, are wheat, barley, rye, and oats.

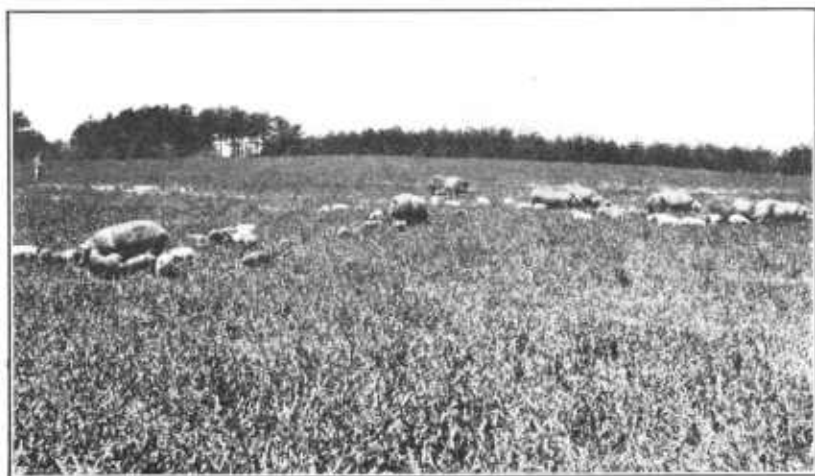


FIGURE 12.—Sows and pigs on rye pasture

Corn should be fed on the cob or shelled. It does not pay to grind it for hogs. Feeding trials show that yellow corn is superior to white corn when fed to pigs up to about 100 pounds' weight, when they are fed in dry lot. The difference in the feeding value of yellow and white corn does not appear when good legume pasture is available or when about 5 per cent of good, leafy, alfalfa hay or alfalfa meal is added to the white-corn ration, and for hogs weighing over 100 pounds, white corn seems to be equal to yellow corn, even in dry lot.

Wheat will generally give somewhat better feeding results than corn. Experiments show that its feeding value varies considerably, but wheat will probably give about 5 per cent better results than corn, pound for pound. The relative value of barley and corn depends to some extent on the weight, per bushel, of the barley. Good, sound barley weighing 46 or more pounds per bushel is considered to be from 90 to 95 per cent as good as corn. Barley of lighter weight has a lower feeding value.

Rye is often fed to hogs and tests show it to be from 95 to 100 per cent as good as corn. Generally rye does not seem to be so palatable to hogs as the other grains and better results are obtained when it is fed with corn, wheat, or barley. Wheat, barley, or rye should be coarsely ground and may be fed dry or in the form of slop.

Oats are a good feed for growing pigs and for brood sows. Oats contain too much fiber and are too bulky to be satisfactory for fattening hogs, although they may be used in addition to corn, wheat, or barley. As compared to corn, oats of standard weight are about 60 to 70 per cent as efficient. Lightweight oats should not be fed, because they are too bulky. It is generally best to feed oats ground or rolled, but feeding in self-feeders or scattered thinly on a feeding floor will prove satisfactory.

Kafir, milo, or feterita are good hog feeds, much the same as corn, though not quite so high in fat. These grains may be fed in the head or if threshed, may be supplied whole or ground. Experiments show them to be from 90 to 100 per cent as good as corn.

Peanuts are grown in many sections of the South and are a good feed for fattening hogs. If peanuts are fed in any great quantity the pork will be soft or oily. While peanuts have a relatively high percentage of protein, the addition of tankage has produced much more rapid and economical gains.

Hominy feed is sometimes fed to hogs and has proved to be a good feed, but its efficiency is from 3 to 7 per cent less than corn.

Potatoes should be cooked when fed to hogs and then about 4½ pounds are necessary to equal 1 pound of corn. Potatoes should be mixed with ground corn, using not more than 4 pounds of potatoes to 1 of corn.

Any of the above grains should be supplemented with some feed high in protein listed under Protein Feeds.

Molasses is not used much as a feed for hogs and should be mixed with concentrates when it is fed. Only a few experiments have been made with this feed for hogs and they show a very wide variation in results, some being as low as about 60 per cent of the feeding value of corn.

Root crops are generally relished by hogs and are desirable but can not be considered an economical feed. Good alfalfa pasture or alfalfa hay is usually more efficient.

Silage, as such, is practically of no value for hogs. When made of standing corn, the feeding value is in direct proportion to the amount of grain contained in the silage.

Proso or hog millet is raised to some extent in the Western and Northern Plain States and is a good feed for hogs. It is carbonaceous and should be ground and fed with a protein supplement.

COOKING AND SOAKING FEEDS

In the earlier days it was generally regarded that practically all feeds for hogs would be made better by cooking, but experiments made by many of the State agricultural experiment stations show conclusively that cooking any of the ordinary grains used in hog feeding is detrimental rather than beneficial, to say nothing of the time and fuel used in cooking.

When suggestions made here for feeding have been followed, either soaking or wetting the feeds is not necessary, except in the case of corn that is especially hard or flinty.

Regardless of the kind or quantity of feed given to hogs, no abrupt changes should be made. Any desirable change of feed should be made gradually by substituting probably not over 25 percent of the new feed for the old and taking at least a week to complete the change.

PROTEIN FEEDS

Any of the feeds referred to thus far must be supplemented with a good protein feed. The ordinary 60 percent packing-house tankage is the feed most generally used for this purpose. Experiments have shown that fish meal is equal in value to tankage, and mixture of either tankage or fish meal 2 parts, linseed meal, cottonseed meal, or alfalfa meal 1 part each, have proved satisfactory. Some experiments with 1 part of tankage or fish meal and 1 part of either linseed or cottonseed meal have given good results. Soybean meal is also used as part of a protein mixture.

Young growing pigs and sows during gestation require a greater percentage of protein to corn than do fattening hogs. As pigs become heavier and fatter, less protein is required.

Both linseed meal and cottonseed meal are fed to hogs as protein feeds, but the best results are obtained when they are mixed with tankage or fish meal, as suggested. Cottonseed meal may have a harmful effect on hogs if fed in too great a proportion, especially in the absence of adequate supplements, such as vitamin A and calcium.

Middlings and shorts are commonly used in hog feeding, generally for sows and pigs during suckling. However, experiments by the United States Department of Agriculture showed that better results were obtained by feeding sows and pigs, during suckling, on corn and tankage than on corn, tankage, and middlings, or on corn and middlings.

Wheat bran is used as a hog feed to a limited extent, but it is too bulky and probably no more valuable than good clover or alfalfa hay.

Skim milk is a valuable protein supplement for grain. A general rule is that 100 pounds of skim milk will replace about 9 pounds of tankage. This feed is regarded by some hog men as being indispensable, but this is not actually the case. A large percentage of successful hog men do not feed milk of any kind.

The best results are obtained from skim milk when it is fed with corn or other fattening feeds, and then in limited quantities, as follows: For pigs just weaned, about 4 or 5 pounds of skim milk to 1 pound of corn; for pigs weighing from 50 to 100 pounds, about 2 to 3 pounds to 1 of corn; for pigs 100 to 150 pounds, about 2½ pounds to 1 of corn. Larger hogs need from 1 to 2 pounds to 1 of corn. From a money-value standpoint 100 pounds of skim milk is worth about as much as one-half bushel of shelled corn.

When the skim milk is from cows that have not been tested and found to be free from tuberculosis, it should be heated to boiling

before being fed to hogs, as this disease can easily be transmitted to hogs in this manner.

Buttermilk that has not been diluted has about the same value as skim milk for hogs. Both semisolid and dried buttermilk are good protein feeds for hogs, but generally the price is too high for either product to be fed economically. Semisolid buttermilk should be diluted with water to about the consistence of ordinary buttermilk and the dried product fed alone in powdered form or mixed with other feeds.

Whey has proved to be a good protein supplement to corn or barley, but a protein of a vegetable nature such as linseed meal, soybean meal, cottonseed meal, or middlings should be added. Whey has produced better results with barley than with corn. Whey is worth about half as much as skim milk when fed in this way.

HOG PASTURES

Pastures for hogs are valuable and should be utilized to as great an extent as possible. The best use of pastures, however, does not mean that hogs fatten or even make satisfactory growth on pasture alone. Pastures of any kind, regardless of quality, must be supplemented with grain if the most satisfactory results are to be obtained.

The hog grower should never attempt to supply only just enough pasture. Pastures will not produce the best results if they are grazed closely. Only as many hogs as can be provided with an abundance of feed should be placed in any lot or pasture. It is impossible to say how many animals may be grazed on an acre, since so much depends on the crop used, the quality of the soil, and climatic conditions. Ordinarily an acre will furnish pasture for from 5 to 15 hogs averaging 100 pounds. It is a good plan to have two pastures for each lot of hogs. By alternating them the pastures may be grazed fairly closely and still provide good, succulent feed. Pasture crops that are allowed to mature do not furnish good feed for hogs.

The fertilizer value of the manure which is left on the land is an indirect and generally unnoticed value that should be taken into account when hog pastures are being considered. Hogs on pasture range all over the inclosure; consequently the distribution of the manure is quite uniform. Furthermore, very little of it is lost. The value to be derived from hog pastures does not apply to any particular locality or section of the country. The only difference in different sections is the length of the pasture season.

The value of good pastures to breeding animals can not be overestimated. To give a maximum of efficiency the breeding sow and boar must have exercise and a variety of feeds. There is no other way by which exercise and variety of feeds can be supplied as well as by giving the animals free range on a good pasture. (Fig. 13.)

PERMANENT PASTURES

In most of the hog-growing sections of the country permanent pastures are generally used by hog raisers. It is not advisable, however, to use any of the permanent pasture grasses in small lots or where a considerable number of hogs are kept on them during most

of the pasture season. Where hogs are kept in any considerable numbers in an inclosure it is always advisable to plow such lots or pastures once each year, though twice a year is better.

Many successful hog growers place on their permanent pastures only a limited number of hogs, such as will permit the pastures to make a sufficient growth to produce a crop of hay. Plants most generally used for permanent pastures are alfalfa, red clover, alsike, white clover, bluegrass, bur clover, Bermuda grass, Lespedeza, carpet grass, crab grass, and Dallis grass. The first five are used in the northern half of the United States. Bluegrass and white clover are generally grown together. Timothy is often grown with red clover. The other plants are grown in the southern parts of the country. All the plants grown in the North are to a greater or less extent grown also in the South. Of all the permanent pasture plants



FIGURE 13.—A breeding herd on alfalfa pasture

alfalfa undoubtedly heads the list for hogs. In localities where this plant can be successfully grown no other permanent pasture is necessary.

TEMPORARY PASTURES

Temporary pastures are used on nearly every hog farm, and are valuable as a supplement to permanent pastures or on farms where there are no permanent pastures. Every barnyard and small lot where hogs are kept should be plowed and seeded at least once a year. These lots are usually well fertilized and produce abundantly.

The most common temporary pastures are rye, oats, wheat, rape, soybeans, and cowpeas. These various pasture plants are grown in practically all parts of the United States. Seeding for temporary pastures should be much heavier than for a grain crop. Rye may be sown in the fall from the 1st of September to December, depending on the locality. In the northern parts of the country it may be grazed until covered by snow or made worthless by freezing. It comes early in the spring and may be grazed until May. If the growth is very rank, it is sometimes advisable to clip it with a mowing machine, setting the cutting bar as high as possible. In the South it may produce good grazing all winter. Winter wheat can

be handled in much the same way. In sections where winter oats are grown the crop can be pastured much the same as rye. In the North oats sown in the spring make a good pasture while they last, but the pasture period is short. Rape is often sown with oats in the spring. When rape is sown the Dwarf Essex variety should be used. This crop may be seeded from early spring until summer. When the plants are from 6 to 10 inches high the crop may be grazed quite heavily. It will keep growing and produce good, succulent feed if the season is right. Seed from 4 to 6 pounds to the acre.

Cowpeas and soybeans are sown in the spring and are sometimes planted together. Of the two, soybeans will generally make the best hog pasture. A variety producing a large quantity of foliage should be selected, preference being given to a variety that does well in the locality. When the plants are 6 to 8 inches high the hogs may be turned in and if a sufficient number of hogs are in the pasture to eat it down, take them out for a while to permit the plants to grow up again.

Dallis grass is a perennial and sweetclover is biennial; the former is grown in the South and the latter in nearly all sections. Both make very satisfactory pastures for hogs. Dallis grass grows well in low, moist lands, makes a good growth in warm weather, and withstands close grazing remarkably well. Sweetclover grows rapidly in good soils and should be grazed heavily to keep the plants from becoming tough and fibrous.

FENCES

If pastures are utilized to the greatest extent, the various fields and lots must be fenced "hog tight." This is most easily and economically done with woven-wire fencing. When 10-acre or larger fields are fenced, it is best to use a fence 26 inches in height, and it is advisable to place one strand of barbed wire at the bottom of the woven fencing just above the ground. Hogs are more easily kept in large inclosures than in small ones; consequently if the inclosures are small a higher fence will be necessary, say 32 or 36 inches.

Most essential of all in constructing a woven-wire fence is to have good, well-braced corner posts. Probably 90 per cent of the efficiency of a woven-wire fence is in the setting and bracing of the corner posts, making possible the taut stretching of the wire. An animal will soon locate a weak spot in a fence and render it practically useless. Regardless of how taut the fence may be when first constructed, it can not remain that way if the corner posts give in the least. When it is found necessary to construct a temporary fence around a small area, it may be made by using 6-inch fence boards, made into panels, and attaching them to temporary posts or stakes driven into the ground, or by using 26-inch woven-wire fencing which may be unrolled and again rolled after using. The latter method, however, is not very satisfactory, as woven wire is not easily rolled in the field.

MINERAL MIXTURES

Inorganic or mineral substances in the diet of hogs are just as necessary for proper nutrition as are the organic compounds (protein, fat, and carbohydrates). Common salt (sodium chloride) is

required in the ration, since it enters into the composition of all the tissues and secretions of the body. Other salts, especially those of calcium and phosphorus, are needed in the growing animal and are required by sows during the gestation period for the proper nourishment of fetuses, and later during the suckling period because of their favorable influence on lactation.

Plants contain small quantities of combinations of sodium, potassium, calcium, magnesium, phosphorus, iron, sulphur, and iodine. Cereal grains, however, have some of these elements in too small amounts to supply the body requirements for nutrition and growth. It is necessary, therefore, to supplement the supply from plants with mineral substances from other sources, particularly in the cases of calcium and phosphorus, and, in some locations, iodine.

The leaves and stems of plants possess a greater percentage of ash, including calcium, than the seeds. Pasture-fed pigs, therefore, require less supplemental mineral feed than those fed in dry lots.

Many combinations of mineral substances have been suggested for supplying the salt, lime, and phosphorus deficiencies in the feed of hogs. Any combination of minerals which contains lime and phosphoric acid enough and is palatable enough to be eaten freely will be satisfactory. A mixture of equal parts of steamed bonemeal, ground limestone or air-slaked lime, and common salt is palatable and contains the elements for supplementing the grain feeds and may be fed to pigs on pasture or in the dry lot. In sections where there is danger of goiter it is advisable to add 0.02 percent of potassium or sodium iodide to the mineral mixture.

Very often wood ashes are available and may be incorporated in the mineral mixture to advantage. When added to the mixture above they may be used to the extent of one-third of the mixture by weight. Thus 35 pounds would be the correct quantity to add to the ingredients listed.

A mineral mixture should be supplied to hogs in boxes or self-feeders where it will be dry and available at all times.

Charcoal is often used in mixtures and is superior to soft coal. Neither charcoal nor coal has much food value, but both appear to be highly palatable to pigs.

WATER

One of the most important matters and one very often neglected is the water supply. Many hogs get their water supply by the herdsman pouring a quantity of water into a foul, dirty trough twice a day. This system of watering is far from being adequate and should not be followed. Every lot or field in which hogs are kept should be supplied all the year with running water, or some system should be installed whereby the supply is automatic and the hogs have water whenever they want it.

THE FATTENING STOCK

There are two general plans to follow after weaning in getting the hogs ready for market. One is to keep them on a good growing ration until about 60 to 75 days before it is proposed to sell them,

feeding them during the last period on a full feed of corn, barley, or wheat, and a protein feed. The other plan is to keep them on full feed all the time until they attain a market weight. The better plan to follow may depend somewhat on market conditions, but more largely on the system of feeding which is best fitted to the particular farm and how it fits into the general farm plan. In either event a pig should never be fed so sparingly that it fails to make gains. The cost per pound of gain must always be considered. If the plan of growing first and fattening later is followed, from 1 to 2 pounds of grain for each hog should be fed daily in addition to pasture. Corn or ground barley is the best feed to use. During the fattening period it is advisable to leave the hogs on good, nutritious pasture if available and to give them all the corn or barley they will eat, supplemented by a protein feed. These feeds may be fed either by hand or self-feeder. In either event they should be fed separately. The



FIGURE 14.—Self-feeders reduce labor costs in fattening hogs

appetites of individual hogs vary, and when feeds are fed separately the hogs may choose their feeds, but when the feeds are mixed some hogs may not eat as much as they require because they are compelled to eat something not palatable to them. (Fig. 14.)

If the hogs are pushed from weaning time to market, probably the most economical plan is to have them on good pasture with free access to shelled corn, wheat, or barley, and a protein feed in self-feeders.

The question of the quantity of feed necessary to produce a hundred pounds of gain naturally comes to the producer and quite as naturally no specific amount can be named. Much depends on the quality of the breeding stock, the quality of the feed, and the ability of the feeder.

If good, well-bred pigs are full fed from weaning to market, satisfactory gains should be made on from 350 to 400 pounds of corn plus from 25 to 35 pounds of tankage per 100 pounds of live weight. Gains are made with less feed than this and sometimes it will take more. If the pigs are started on feed at larger weights say from 75

pounds or more, the feed cost per 100 pounds of gain will probably be greater.

A successful and economical plan of fattening hogs is to "hog down" the corn, also letting the hogs have access to a good alfalfa or red-clover pasture and a protein feed in a self-feeder. The hogs will harvest all the corn in this way and in addition help build up the fertility of the soil. (Fig. 15.)

Under any plan of feeding, free access to good, pure water and a mineral mixture containing salt is necessary at all times.

Based on a series of years, hogs weighing from 190 to 235 pounds will command a better price, at least three-fourths of the time, than hogs of lighter or heavier weights. It is impossible to say when fat hogs should be marketed, but a safe plan is to sell when they are at a market weight which commands the best price at the time.



FIGURE 15.—An economical way to harvest the corn crop

No one can foretell future prices; consequently if the producer holds his fat hogs for a better market, he may be sadly disappointed.

FEEDER PIGS

During the last few years there has been an increasing demand for feeder pigs, or pigs weighing generally from 75 to 100 pounds, in some cases up to 120 pounds. This demand comes largely from farmers in the Corn Belt and from men who devote their time to the business of fattening these pigs. Other demands for feeder pigs come from garbage-feeding and serum plants near large cities in different parts of the country.

In the irrigated valleys of the West alfalfa can generally be produced in abundance. In the southern and southeastern sections various good pasture crops for hogs, such as Lespedeza, winter oats, rye, wheat, carpet grass, and Bermuda grass can be easily produced. In many of these sections a feed crop necessary to fatten hogs is uncertain, yet it is sufficiently large to be economically used to supplement pastures and make the production of feeder pigs profitable. In view of the demand for feeder pigs at all seasons of the year,

the production of these pigs should be given consideration in localities where fattening crops are uncertain. (Fig. 16.)

Twelve different experiments have been conducted at the United States experiment stations in South Dakota and Montana in the production of feeder pigs. When the pigs received $1\frac{1}{2}$ pounds of corn per head daily, without any protein supplement except alfalfa pasture, the range in the quantity of corn needed to produce 100 pounds of gain was from 230 to 300 pounds, averaging about 264. The pigs made an average daily gain of 0.57 pound. These pigs were fed from weaning time to a weight of approximately 100 pounds. A few experiments in which 1 pound of corn per pig was fed daily showed a smaller feed consumption and a slower gain, while 2 pounds per pig daily resulted in more rapid gains at a higher cost.

SELECTING PIGS FOR BREEDING

Every hog grower should look his pig crop over each year and if possible select a few gilts that will be an improvement in the breed-

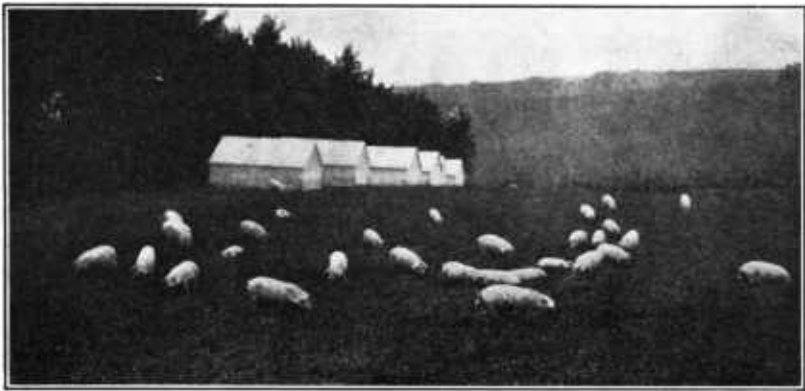


FIGURE 16.—Feeder pigs on alfalfa pasture

ing herd. Sometimes there is an outstanding animal that may be selected soon after weaning, but generally it is best to defer the selections until the pigs are from 5 to 6 months of age. By that time they are so well grown that their faults can be detected. A good, tried brood sow should not be replaced by a gilt unless the change is reasonably sure to make an improvement in the quality of the herd. (Fig. 17.)

If possible the gilts selected for the breeding herd should be placed in a good pasture by themselves. While they should not be too heavily fed, they should be given a liberal ration. Corn should be fed only in limited quantities—from one-fourth to one-third of the total feed. Shorts or middlings, to which is added a little tankage or fish meal, fed either dry or in a thick slop, can constitute, with pasture, a very satisfactory ration. Mineral mixture, salt, and water should always be kept before them. If after the selection has been made any gilt does not develop satisfactorily she should be discarded from the herd and fattened for market.

THE PUREBRED HOG BUSINESS

A beginner in the hog-raising business should get purebred animals for his foundation, but he should confine his efforts to the raising of market hogs for a few years, or until he knows how to mate animals for good results and how to feed them properly. Purebred hogs may be expected to make more rapid growth than those of mixed breeding. After he has become proficient he may be able to embark in the business of growing purebred hogs with good prospects of success.

The method of handling hogs to be used for breeding purposes is somewhat different from that of fattening them for market. Breeding hogs must be fed with the purpose in mind of growing a good frame that will support the body for several years rather than one whose usefulness ends at the age of 8 or 9 months. In order to do this a higher percentage of protein and mineral feeds must be used

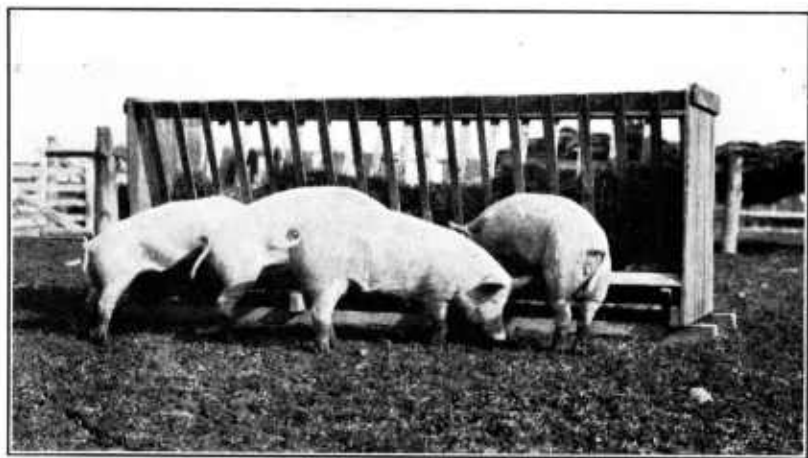


FIGURE 17.—Gilts from 5 to 6 months old show desirable qualities as well as defects, which indicate their probable value as breeding animals

for the breeding hogs, and they should have the run of a good pasture during the entire time when it is possible to have pastures. The kind of pasture used is of less importance than the fact that pasture is provided. They should have some corn, possibly about one-fourth of the ration, the balance to be made up of shorts or middlings, a little fish meal or tankage, and pasture. Skim milk or buttermilk is recommended if available.

If oats are to be fed, they should be good and plump, weighing 32 pounds or more per bushel. Lightweight oats contain too much fiber to be a good feed for hogs. Oats may be fed in a self-feeder or scattered thinly on a feeding floor, but should never be fed by pouring them in piles or in a trough. Too many breeders of purebred hogs follow the plan of buying high-priced concentrates and mixed feeds, when feeds that they are growing on their own farms would produce just as good animals at much less cost.

The practice of keeping a registered herd of purebred hogs and selling the offspring for breeding purposes is a branch of the hog business that may be carried on at a profit, but is often a failure,

usually due to unbusinesslike methods. The successful breeder of purebreds must know both the feeding and breeding problems of the business, and in addition must be a good salesman.

KEEPING RECORDS

Some system of identification marks and a book record of them, whereby the pigs of each litter may be known, is always to be advised. If the herd is one from which pedigreed stock for breeding purposes is sold, some system of marking must be followed. The most satisfactory method is by making notches in the ears. In order that no mistake may occur, every pig should be marked at farrowing time. Ear tags of different kinds are used, but they often tear out and the identity of the pig is lost.

If hogs are raised for market only, earmarking the pigs is of great assistance in making selections for the breeding herd. Proper selection can be made only when the dam of the pig is known and her record of performance examined. The date when every sow in the herd is bred should be known and recorded. If this is not done, the

herdsman will not know when she is due to farrow and can not intelligently feed and care for her. Such a record can not be made properly unless the individual animals in the herd are earmarked.

Any system of earmarking which is accurate and convenient for the herdsman in the identification of his pigs may be followed. The sys-

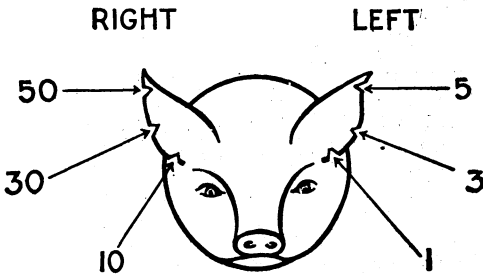


FIGURE 18.—Method of earmarking pigs

tem indicated in Figure 18 should be satisfactory.

The notches in the ear can be made best with small, sharp, side-cutting pliers. Little trouble will be experienced in having permanent marks for identification if care is used to include a part of the cartilage of the ear as well as the skin when making the notches. The marks are made best soon after the litter is farrowed, when the wounds heal quickly.

SELLING BREEDING STOCK

The first essential in selling breeding stock is in closely culling the herd and offering only animals of merit. The percentage of hogs in the herd that should be culled and fattened for market varies widely. Much depends on the quality of individual animals in the breeding herd and the herdsman's ability to make the best of them by feeding and handling. A herd would be above the average in which 50 per cent or more of the animals should not be culled out and fattened for market.

Two general systems are followed in disposing of surplus stock, viz, public and private sale. The public-sale system is quite generally followed and has many advantages. All the stock is sold in one day, and the buyer sees what he is buying and names his own price. Among the disadvantages of the public sale are the time and expense

in making arrangements, constructing the sale ring, providing the lunch, and the possibility of bad weather, which may make a considerable difference in the prices obtained. The private-sale system calls for a different plan of advertising and requires also considerable correspondence, in which the seller must be very careful in the description of what he has for sale. He should be careful never to overestimate the quality or value of the animals offered. A common mistake made by breeders of purebred stock is that they do not cultivate the trade of farmers in their own locality. They spend far too much time and money in trying to interest purchasers from a distance. Many bright prospects for success in the purebred business have resulted in failure solely because the breeders have tried to break a record in top prices. Generally the record-breaking price is made because the purchaser gets time in which to make payment. If every transaction in the purebred business were made on a strictly cash basis the disastrous "booms" would not happen.

SANITATION

Results that may be obtained by following the very best methods of feeding and breeding will be lessened to a great extent unless sanitary conditions on the farm are given careful attention. The greatest losses among hogs are caused by hog cholera. Next in importance is tuberculosis. Other causes are hog "flu" and external and internal parasites. Hog cholera and tuberculosis are infectious diseases, and animals contract them only by coming in direct contact with the virus or germs of the disease. Insanitary hog lots and buildings may not produce these diseases, but they may have a permanently bad effect on the vitality of the animal. Naturally the animal with the greatest vitality will be in better condition to resist the attack of any disease than will the one low in vitality; hence insanitary conditions in the hog lot may have much to do with losses from either of these diseases.

Farrowing houses and sleeping quarters should be kept thoroughly cleaned and supplied with fresh bedding at frequent intervals. The bedding should be changed before it becomes wet and foul. This change may be necessary in two days, or it may be two weeks. The floors of the sleeping quarters may become not only foul but dusty. Dust is irritating to the lungs and may convey eggs of parasites as well. For this reason floors should be thoroughly cleaned, swept at least every two or three weeks, and disinfected with a 3 per cent solution of compound cresol (U. S. P.).

Pens, as well as feeding places that are not plowed, should have frequent applications of air-slaked lime, which will aid in the drying of damp places and assist in disinfection. All barnyards and lots on which hogs are kept for any length of time should be plowed at least twice a year as an aid in the disinfection of the premises. Temporary pasture crops can be grown in these lots, thereby making the plowing profitable in two ways.

The swine sanitation system developed by the Bureau of Animal Industry as a control measure for the large intestinal roundworm and other parasites of swine involves: (1) Washing the sow's udder and sides with soap and water before putting her in the farrowing pen shortly before farrowing; (2) cleaning and scalding the far-

rowing pen with hot water and lye before the pregnant sow is placed in it; and (3) hauling the sow and her litter two weeks after farrowing to a pasture on which no hogs have been for at least a year, and keeping the pigs on a clean pasture until they are at least 4 months old.¹ If the sows have been running on pasture and are not encrusted with mud or filth, the farrowing may be done on a clean pasture to which the sows are transferred directly. This modification is applicable to fall farrowing in practically all States and is suitable for both spring and fall farrowing in the South.

SHADE

Hogs suffer greatly from heat and must have shade, which is best provided by trees, where there are a sufficient number close enough

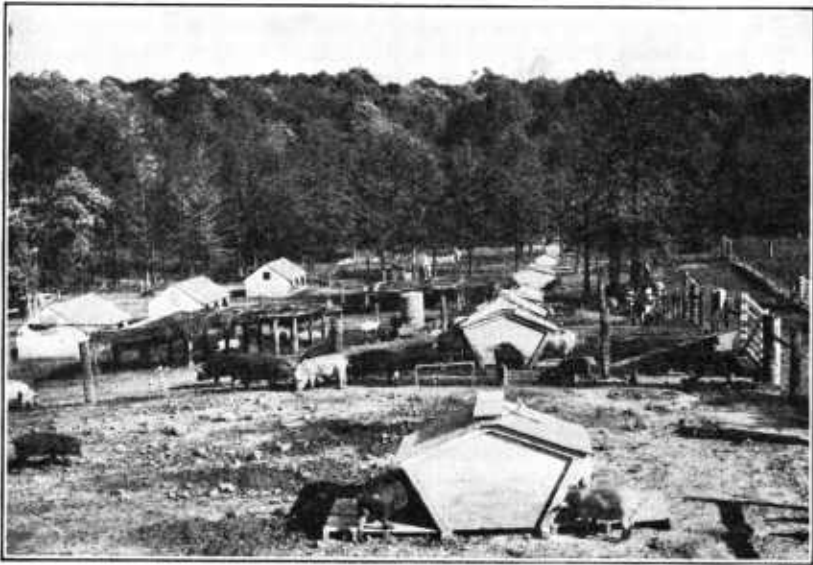


FIGURE 19.—Well-equipped paddocks, with artificial and natural shade.

together. Neither the ordinary farrowing house with a low ceiling, commonly used in the North, nor the box-type or A-shaped individual house should be used for shade, because hogs will seek the shade even though they suffocate, and such structures do not have sufficient air space or circulation. They should be kept closed to prevent hogs from lying in them in hot weather.

A very satisfactory structure for providing shade consists of a framework about 4 feet high, made of posts, poles, or almost any available material, and having the top covered with hay, straw, or weeds to a depth of at least 2 feet. When dust accumulates under the shelter, wetting the covering so that the water drips through will both lay the dust and cool the air within the structure. (Fig. 19.)

¹ For detailed information on swine sanitation consult Department of Agriculture Leaflet No. 5.

HOG WALLOWS

A hog wallow made of concrete and located in a convenient shady place is a benefit in a hog yard, but a mud wallow made by the hogs rooting a hole in the lot or pasture is a nuisance and should not be allowed to remain. It is impossible to keep the mud wallow in anything resembling a sanitary condition. The hogs will often drink of the water that has become stagnant and foul, and therefore a source of danger. The concrete wallow should contain from 4 to 6 inches of water and should frequently be cleaned and refilled with fresh water. Enough crude oil to form a thin layer on the water should be poured into the wallow about every 10 days to control lice.

DISEASES

Among the important diseases of hogs are hog cholera, tuberculosis, and parasitic affections. Hog "flu" or swine influenza has in recent years been recognized as a distinct infection. Its symptoms are loss of appetite, violent coughing, occasional vomiting, and rise of temperature. The only known treatment consists in placing the hogs in warm dry quarters, allowing them as complete rest as possible, and giving them a constant supply of fresh drinking water. The cause of this disease is unknown.

Post-mortem examination of the carcasses of animals that die on the farm is seldom made; consequently the cause of death is usually unknown. Because some other farm animals have diseases that can be transmitted to hogs, the danger of permitting hogs to eat the carcasses outweighs the feeding value of the carcass, and the practice should not be followed.

HOG CHOLERA

Of all the diseases from which hogs suffer, hog cholera causes the greatest loss. It is an infectious disease, and the herd is safe from possible attack only when immunized by the virus-serum treatment. Giving the pigs this treatment when they are young permanently immunizes them.

During the period 1921-1930 the United States Department of Agriculture immunized more than 9,000 suckling pigs ranging from 1 day to 12 weeks in age. It was found that age is not a factor in successful immunization. There are distinct advantages in immunizing the pigs early. When the pigs are weaned, fattening them for market can be begun immediately without losing time in reducing the feed because of immunization; less serum is needed to immunize pigs; there is much less danger of complications with other diseases; and the period during which they are susceptible to hog cholera is shorter.

If a suspicious ailment occurs, it is best to consult a reliable veterinarian, and if the disease is diagnosed as hog cholera all the uninfected animals should be removed to clean disinfected quarters, and all the hogs in the herd should be immunized with serum and virus as soon as possible. If any of the animals die, the carcasses should be burned to ashes, not buried. Farmers' Bulletin 834 discusses the subject of hog cholera fully.

TUBERCULOSIS

Tuberculosis among hogs in the United States exists to a considerable degree, particularly in the Middle Western States. The extent of infection in a carcass determines whether it must be condemned wholly or partly.

The source of this disease in hogs is very largely tuberculous fowls. However, there are still some tuberculous cattle in the United States that spread this disease to swine. The disease is most frequently spread to swine by their eating fowls affected with generalized tuberculosis or by having the feed or water contaminated with excretions carrying the tubercle bacilli. Where tuberculosis still remains in dairy herds, hogs may become infected by drinking unsterilized milk or dairy products or by eating grain that has passed undigested through tuberculous cattle. Milk from herds which are shown by the tuberculin test not to be free from tuberculosis should be made safe by being sterilized or cooked before it is fed. In order to destroy disease germs it is necessary to subject the substance containing them to the boiling temperature long enough for the interior of the mass to reach that temperature or else to hold it at a temperature of 140° F. for at least an hour. In some cases tuberculosis is probably transmitted from one hog to another. Fowl tuberculosis is also readily transmissible to swine. Tuberculous hogs can scarcely ever be detected by their appearance, the only reliable means of detection being the tuberculin test and slaughter. If hogs sold for slaughter are found to be tuberculous, it is best to fatten and sell all those remaining in the herd if they are grades. If they are valuable pure-breds, a competent veterinarian may be able, by means of the tuberculin test, to identify the diseased animals. All reactors to the test should be slaughtered and inspected. Those failing to react may be retained for breeding purposes but should be subjected to a retest in from 60 days to 6 months. This subject is discussed in detail in Farmers' Bulletin 781, Tuberculosis of Hogs.

PARASITES

Hogs of all ages may be affected by external and internal parasites that may cause death, particularly among pigs; indirect losses resulting from reduced vitality are frequent. Parasitism prevents the best and most rapid development. A hog with reduced vitality is naturally more susceptible to attack. Pigs and young hogs are affected with parasites more than are older hogs.

INTESTINAL WORMS

Intestinal worms are common among hogs of all ages and are particularly injurious to young growing pigs. Pigs become infested with these worms by swallowing the worm eggs in the manure of infested hogs or on the soil of pens, yards, and pastures that have been occupied by infested hogs.

Every yard and lot in which hogs run to any considerable extent should be plowed and seeded to a temporary pasture crop at least once every year; twice a year would be better. Mineral mixtures will help to keep hogs in good condition, but they do not remove worms or prevent worm infestation. Good, strong, healthy animals

have greater resistance to the effect of worms than do unthrifty, weak, and generally run-down animals.

Medicinal treatment for worms must be resorted to when methods of prevention have failed or when the pigs have been neglected and have become unthrifty.

Investigations by the Zoological Division, Bureau of Animal Industry, indicate that oil of chenopodium in doses of one-half of 1 fluid dram with at least 2 ounces of castor oil for 100-pound pigs is the most effective treatment for the removal of large intestinal roundworms. The larger dose is more effective, but the smaller dose is safer. Santonin in doses of two-thirds grain per pound of body weight, followed in 12 hours by 15 grains of Epsom salt per pound of body weight—about $3\frac{1}{2}$ ounces for a 100-pound pig—in wet mash is also an effective treatment, but is more expensive than oil of chenopodium. All worm treatments should be given after the animals have been kept without feed for at least 24 and preferably 36 hours, and they should not be fed sooner than four hours after treatment. Treatments for worms are best administered by a veterinarian.

LICE

Hog lice are probably the most common external parasite affecting hogs. They can be found to some extent in most herds at any time. They sustain life by sucking the blood of the animal and are commonly found inside and back of the ears and in the folds on both the front and hind legs. If left alone they thrive and multiply at all seasons of the year. By close attention and applying the right remedies at the right time, lice can be kept down so that the damage they do is negligible.

The common methods of combating hog lice are dipping, spraying, and using hog oilers and medicated hog wallows. To free hogs of lice, dip them in a vat of water covered with a heavy layer of crude petroleum, or dip them twice or oftener in a coal-tar solution at intervals of from 15 to 16 days. Farmers' Bulletin 1085 discusses both hog lice and hog mange.

MANGE

Mange is a skin disease caused by small parasites called mites. It is usually first noticed on account of the formation of crusty scabs around the eyes and ears, from which the disease spreads to the neck and shoulders and along the back and sides, and finally covers the entire body. The hair is stiff and erect, giving the pig a very unthrifty appearance. Hogs of any age may be affected with mange. Because of their habit of lying close together, the disease spreads rapidly from one animal to another. Those kept in good, dry, clean, well-bedded quarters are seldom affected with mange, which usually attacks hogs that are allowed to sleep in damp dark sheds or barns or on manure piles or old damp straw piles. The most important measure is to clean up mange in the herd and prevent subsequent contacts with infected animals.

The same remedies and treatments recommended for lice should be used for mange.

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